

NEW ENGLAND NOTE

DESMONEMA WRANGELLII (AG.)
BORNET ET FLAHAULT, A
NEW RECORD FOR MAINE

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During a field trip in search of *Micropterus dolomieu* Lacepede in south-central Maine, my collecting gear got caught on the rough and irregular surface of a massive basalt rock partially submerged in the water of Crawford Pond, Union, Maine. This pond in Knox County has been previously described (Colt, 1977, 1985). This rock surface lies on the east side of the large central island in the northern section of the pond, and is identified by the presence of several bronze plaques attesting to the unfortunate but accidental deaths of several people in that area of the pond's waters.

While retrieving my collecting gear I found that the entire surface of the rock below the water line was covered by a brownish felt-like mat of microscopic plants. Several samples of the plants were gathered and preserved in Transeau's Fluid (Prescott, 1962) since the proper equipment for examination of the samples was not immediately available.

Subsequent examination of the plants with a light microscope in my laboratory at the University of Massachusetts Dartmouth revealed that the plants were a cyanophyte alga, and using Smith (1950), the plant was identified as *Desmonema wrangellii* (Ag.) Bornet et Flahault 1887. The characteristics of the Maine plants matched the description by Smith, and subsequently, the descriptive material in Tilden (1910). Smith notes that the plant has parallel trichomes within common sheaths, and penicillate tufts which readily dissemble upon removal from the substrate. Tilden adds that heterocysts are basal, the plant mass caespitose and penicillate, and the filaments somewhat dichotomously divided. The summary environmental characteristics provided by VanLandingham (1982) generally fit. Although my plants were collected in a pond, there is frequent wind-aided water drift in the vicinity of the rock surface, along with small wave action, thus moving water is present, a characteristic of *Desmonema* habitat reported to frequently occur.

Drouet, in his monumental Revision of the Nostocaceae with Cylindrical Trichomes (1973), placed *Desmonema* in synonymy with *Scytonema hofmannii* Ag. According to Drouet, the plant identified by Bornet & Flahault as *Desmonema* is the same as the plant named *Thorea* by Agardh in 1812, as *Oscillatoria* by Agardh in 1813, as *Calothrix* by Bornet et Flahault in 1887, as *Coleodesmium* by Borzi in 1887, and as *Dillwynella* by Kuntze in 1891.

Drouet (1973) reduced the Nostaceae with cylindrical trichomes to three genera by characterizing the morphology of the terminal cells in the following manner.

- Scytonema*: Terminal vegetative cells at first hemispherical, becoming almost spherical
- Calothrix*: Terminal vegetative cells at first hemispherical, becoming blunt-conical or cylindrical with rotund tips.
- Raphidopsis*: Terminal vegetative cells at first hemispherical, becoming more or less acute-conical.

Not all cyanophyte specialists agree with Drouet's revision. While Drouet examined an enormous number of specimens, more than 30,000, in researching his revisions of the cyanophytes, he came to depend on such characters as granulation (among the Oscillatoriaceae) and the shape of the terminal cell of the vegetative portions of the plants in both the Oscillatoriaceae and the Nostocaceae. Drouet (1973) states that the constant features of morphological value in classification of the Oscillatoriaceae are those of the protoplast alone. The characteristics of the external sheath, according to Drouet, are the products of the history of the environment and as a result, prove to be of no value for the purposes of classification. He further notes, writing about the Oscillatoriaceae, that the "end of a fragmented trichome proceeds, under favorable environmental conditions, to assume a configuration characteristic of the species".

There seems to be no disagreement among cyanophycologists that there is a great deal of morphological variation among the blue-green algae, and that this variation is primarily a function of environmental or habitat variation. Baker and Bold (1970) in their two-year culture studies in the Oscillatoriaceae note that the vegetative terminal cells in their cultures showed considerably more morphological variation than Drouet's work would seem to allow as permissible. Kathleen Baker of the University of Ha-

waii (Pers. comm.), who was kind enough to respond to my query on *Desmonema*, suggested that much work remains yet to be done by microbiologists to fully establish the relationships among the cyanophytes.

While my plants show the hemispherical-approaching-spherical cells of *Scytonema*, my experiences with desmid (Desmidiaceae) cells, where morphological changes in the new vegetative semicells appear to be the result of environmental factors present immediately prior to or during their development, leads me to wonder if such dependence on the morphology of one cell is appropriate. New desmid semicells can and do show distinct morphological differences from the parent (semicell), and if these changes persist into the next vegetative generation, subsequent observations can lead to the erroneous conclusion that the "new" semicells represent a new taxon. I suggest that what are needed are discrete studies at the molecular level which would identify the relationships among or the differences between the many already described cyanophyte taxa. I am aware that some studies have been undertaken, but these few appear to represent only a minute fraction of what is needed to clearly and accurately define the cyanophytes.

When I checked the New England Algal Data Bank (NEADB, 1993) to determine whether or not this plant had been previously collected in the New England Region, the only reported collection was by W. A. Setchell (1895) in New Haven, Connecticut. Given the large number of plants at the Maine site, the lack of other collections in New England seemed curious. Geitler (1932) reports *Desmonema* as being collected in England and the Pyrenees, and Whitford and Schumacher (1969) and Cocke (1967) report *Desmonema* from North Carolina, but I am not aware of any other reports from New England.

Given Drouet's assignment of *Desmonema* to *Scytonema*, it seemed reasonable to determine whether or not *Scytonema hofmannii* had been reported in New England. According to data in the NEADB Conn and Webster report *S. hofmannii* in Middlesex County, CT, in 1908, and Holden is reported in both Tilden (1910) and Hylander (1925, 1928) to have collected it in Litchfield County, CT. Setchell (1896) collected *S. hofmannii* in Norfolk County, Massachusetts, and Collins (1904b) collected *S. hofmannii* in Grafton County, New Hampshire. The latter two collections are noted in Tilden (1910). Bailey (1847b) reported *S.*

hofmannii from Providence County, Rhode Island, and Flint (1916) collected *S. hofmannii* in Chittenden County, Vermont. The question is, do these all represent the same species, *Scytonema*, as reported by Drouet?

In that my own research is with certain of the chlorophytes, I feel somewhat uneasy in making any final determination on the systematic position of the cyanophyte plants which I collected in Maine. Despite the conclusions of Drouet, however accurate as they may eventually be shown to be, and given the uncertainties expressed in the literature and by personal communication I believe the appropriate action at this time is to report the collection of *Desmonema wrangellii* (Ag.) Bornet et Flahault for the second time in New England and for the first time in Maine.

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